

## **AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

- 1           1. (Currently amended) An apparatus that implements a last-in first-out  
2   buffer, comprising:  
3           a plurality of cells arranged in a linear array to form the last-in first-out  
4   buffer;  
5           wherein each cell in the linear array operates asynchronously with respect  
6   to other non-neighboring cell in the linear array;  
7           wherein a given cell in the interior of the linear array is configured to  
8   asynchronously coordinate operations with only a preceding cell in the linear array  
9   and a subsequent cell in the linear array without relying on external controls and,  
10   more specifically, is configured to receive get and put calls from the preceding  
11   cell in the linear array, and to make get and put calls to the subsequent cell in the  
12   linear array;  
13          wherein if the given cell contains no data items, the given cell is  
14   configured to make a get call to retrieve a data item from the subsequent cell,  
15   whereby the data item becomes available in the given cell to immediately satisfy a  
16   subsequent get call to the given cell from the preceding cell without having to  
17   wait for the data item to propagate to the given cell from subsequent cells in the  
18   linear array;  
19          wherein if the given cell contains no space for additional data items, the  
20   given cell is configured to make a put call to transfer a data item to the subsequent  
21   cell, whereby space becomes available in the given cell to immediately satisfy a

22 subsequent put call to the given cell from the preceding cell without having to  
23 wait for data in the given cell to propagate to subsequent cells in the linear array;  
24 and  
25 wherein inter-cell communications between the plurality of cells take place  
26 asynchronously without reference to a system clock signal.

1 2. (Canceled).

1 3. (Original) The apparatus of claim 1, wherein the given cell includes:  
2 a master location for storing a data item; and  
3 a slave location for temporarily storing a new data item during a put  
4 operation to the given cell until a preexisting data item in the master location can  
5 be moved to the subsequent cell to make room for the new data item.

1 4. (Original) The apparatus of claim 1, wherein the given cell includes a  
2 first location and a second location for storing data items.

1 5. (Original) The apparatus of claim 1, wherein the given cell includes a  
2 first location, a second location and a third location for storing data items.

1 6. (Original) The apparatus of claim 1, wherein the given cell includes  
2 more than three locations for storing data items.

1 7. (Original) The apparatus of claim 1, wherein each cell in the linear array  
2 includes circuitry to determine if all subsequent cells in the linear array are  
3 completely full.

1           8. (Original) The apparatus of claim 1, wherein each cell in the linear array  
2 includes circuitry to determine if all subsequent cells in the linear array are empty.

1           9. (Currently amended) An apparatus that implements a last-in first-out  
2 buffer, comprising:

3           a plurality of cells arranged in a linear array to form the last-in first-out  
4 buffer;

5           wherein each cell in the linear array operates asynchronously with respect  
6 to other non-neighbor cell in the linear array;

7           wherein a given cell in the interior of the linear array is configured to  
8 asynchronously coordinate operations with only a preceding cell in the linear array  
9 and a subsequent cell in the linear array without relying on external controls and,  
10 more specifically, is configured to receive get and put calls from the preceding  
11 cell in the linear array, and to make get and put calls to the subsequent cell in the  
12 linear array;

13          wherein if the given cell contains no data items, the given cell is  
14 configured to make a get call to retrieve a data item from the subsequent cell,  
15 whereby the data item becomes available in the given cell to immediately satisfy a  
16 subsequent get call to the given cell from the preceding cell without having to  
17 wait for the data item to propagate to the given cell from subsequent cells in the  
18 linear array;

19          wherein if the given cell contains no space for additional data items, the  
20 given cell is configured to make a put call to transfer a data item to the subsequent  
21 cell, whereby space becomes available in the given cell to immediately satisfy a  
22 subsequent put call to the given cell from the preceding cell without having to  
23 wait for data in the given cell to propagate to subsequent cells in the linear array;

24          wherein communications between the plurality of cells take place  
25 asynchronously without reference to a system clock signal;

26            wherein each cell in the linear array includes circuitry to determine if all  
27   subsequent cells in the linear array are completely full;  
28            wherein each cell in the linear array includes circuitry to determine if all  
29   subsequent cells in the linear array are empty; and  
30            wherein inter-cell communications between the plurality of cells take place  
31   asynchronously without reference to a system clock signal.

1            10. (Original) The apparatus of claim 9, wherein the given cell includes:  
2            a master location for storing a data item; and  
3            a slave location for temporarily storing a new data item during a put  
4   operation to the given cell until a preexisting data item in the master location can  
5   be moved to the subsequent cell to make room for the new data item.

1            11. (Original) The apparatus of claim 9, wherein the given cell includes a  
2   first location and a second location for storing data items.

1            12. (Original) The apparatus of claim 9, wherein the given cell includes a  
2   first location, a second location and a third location for storing data items.

1            13. (Original) The apparatus of claim 9, wherein the given cell includes  
2   more than three locations for storing data items.

1            14. (Currently amended) A method for implementing a last-in first-out  
2   buffer, wherein the method operates within a plurality of cells arranged in a linear  
3   array to form the last-in first-out buffer, wherein each cell in the linear array  
4   operates asynchronously with respect to other non-neighboring cells in the linear  
5   array, wherein a given cell in the interior of the linear array is configured to  
6   asynchronously coordinate operations with only a preceding cell in the linear array

7 and a subsequent cell in the linear array without relying on external controls and,  
8 more specifically, is configured to receive get and put calls from the preceding  
9 cell in the linear array, and to make get and put calls to the subsequent cell in the  
10 linear array, the method comprising:  
11 making a get call from the given cell to retrieve a data item from the  
12 subsequent cell if the given cell contains no data items, whereby the data item  
13 becomes available in the given cell to immediately satisfy a subsequent get call to  
14 the given cell without having to wait for the data item to propagate to the given  
15 cell from subsequent cells in the linear array; and  
16 making a put call from the given cell to transfer a data item to the  
17 subsequent cell if the given cell contains no space for additional data items,  
18 whereby space becomes available in the given cell to immediately satisfy a  
19 subsequent put call to the given cell without having to wait for data in the given  
20 cell to propagate to subsequent cells in the linear array;  
21 wherein inter-cell communications between the plurality of cells take place  
22 asynchronously without reference to a system clock signal.

1 15. (Canceled).

1 16.(Original) The method of claim 14,  
2 wherein the given cell includes a master location and a slave location for  
3 storing data items; and  
4 wherein during a put operation to the given cell involving a new data item,  
5 the new data item is temporarily stored in the slave location until a preexisting  
6 data item in the master location can be moved to the subsequent cell to make  
7 room for the new data item.

1           17. (Original) The method of claim 14, wherein the given cell includes a  
2   first location and a second location for storing data items.

1           18. (Original) The method of claim 14, wherein the given cell includes a  
2   first location, a second location and a third location for storing data items.

1           19. (Original) The method of claim 14, wherein the given cell includes  
2   more than three locations for storing data items.

1           20. (Original) The method of claim 14, further comprising monitoring  
2   signals from subsequent cells in the linear array to determine if the subsequent  
3   cells are completely full.

1           21. (Original) The method of claim 14, further comprising monitoring  
2   signals from subsequent cells in the linear array to determine if all the subsequent  
3   cells are empty.